

ISSN 0258 - 8013
CODEN ZDGXER

中国电机工程学报

半月刊

第 42 卷 第 10 期

Proceedings of the CSEE

SEMIMONTHLY

Vol.42 No.10

中国电机工程学报

第四十二卷
第十期
二〇二二年五月

Proceedings of the CSEE
Vol.42 No.10 May 2022



5月
2022
2022-05-20 出版

ISSN 0258-8013



中国电机工程学会主办
THE CHINESE SOCIETY FOR ELECTRICAL ENGINEERING



中国电机工程学报

ZHONGGUO DIANJI GONGCHENG XUEBAO

第 42 卷

第 10 期 (总第 693 期)

2022 年 5 月 20 日

目 次

(论文电子版 <http://www.pcsee.org/CN/volumn/home.shtml>)

· 智能电网 ·

- 基于矩阵范数优化理论的用电数据质量提升算法.....杨挺, 孙兆帅, 季浩, 叶芷杉, 耿毅男 (3501)
- 能源互联网背景下数据中心与电力系统协同优化(二): 机遇与挑战
.....曹雨洁, 丁肇豪, 王鹏, 张素芳, 刘吉臻, 刘文娟, 程明 (3512)
- 基于区块链的多能协同运行(二): 仿真平台与算例.....沈泽宇, 陈思捷, 严正, 张玲, 段国华 (3527)
- MMC 系统稳定裕度随内环电流控制带宽的非单调变化特性及机理分析.....王燕宁, 郭春义, 杨硕, 庞博, 林欣 (3538)
- 基于合作博弈的多综合能源服务商运行优化策略.....崔明勇, 宣名阳, 卢志刚, 何良策 (3548)
- 基于边缘注意力生成对抗网络的电力设备热成像超分辨率重建.....赵洪山, 彭轶灏, 刘秉聪, 王震, 王奎 (3564)
- 计及电动汽车需求和分时电价差异的区域电网 LSTM 调度策略
.....史文龙, 秦文萍, 王丽彬, 姚宏民, 景祥, 朱云杰, 薛邵锴 (3573)
- 基于故障暂态过程的半波长输电线路差动保护策略(英文).....曹璞璘, 王登, 范浩然, 束洪春, 韩一鸣, 杨博, 董俊 (3587)

· 可再生能源并网技术 ·

- 基于无模型自适应控制的双馈风机次同步振荡附加阻尼控制方法
.....吴熙, 王梦婷, 施星宇, 徐珊珊, 袁超, 杨宏宇 (3601)
- 双馈风电场并网次/超同步振荡建模与机理分析(二): 阻抗特性与振荡机理分析
.....李光辉, 王伟胜, 张兴, 何国庆, 刘纯 (3614)
- 直驱风机经柔直送出系统多控制环节间交互机理研究
.....尹睿, 孙媛媛, 王姗姗, 赵兵, 吴广禄, 秦善萌, 赵悦彤, 王铁柱 (3627)
- 考虑异质能流输运特性的多能源系统惯量极限优化.....孙鹏, 滕云, 回茜, 陈哲 (3642)

· 发电 ·

- 基于堆叠自动编码器的汽轮发电机多指标故障诊断模型
.....叶林, 葛鸥翔, 郭永红, 梅东升, 毛永清, 王斌, 路朋, 戴斌华 (3656)
- 考虑系统氢耗和耐久性的多堆燃料电池优化控制方法.....蔡良东, 李奇, 刘强, 王天宏, 杨文, 陈维荣 (3670)
- 内嵌加热管束反应床 $\text{Ca}(\text{OH})_2/\text{CaO}$ 热化学储能性能研究.....刘旭光, 段立强 (3680)
- 燃料预重整份额对 SOFC-GT 混合发电系统设计的影响.....黄尚龙, 杨晨, 陈浩, 马强, 赵波 (3691)
- 运行水头对超低水头两叶片贯流式水轮机空化性能的影响研究
.....孙洁, 葛新峰, 蔡建国, 张辉, 武恩全, 姜梅, 祝双桔, 韩洋, 赵雷, 郑源 (3701)
- 基于正交试验的级联相变蓄热装置相变材料高度的优化.....曹丽华, 李亚强, 于靖雯 (3711)

· 电力电子与电力传动 ·

- CLLC 双向谐振变换器电感-变压器矩阵式一体化集成与优化设计
.....李俊杰, 吴红飞, 花文敏, 杨帆, 刘越, 何静, 程钰杰 (3720)
- 负带通滤波器反馈进网电流有源阻尼方法的实现技术研究.....李明明, 肖华锋 (3729)
- 基于分立器件并联型碳化硅逆变器的叠层母排设计研究.....於少林, 张兴, 王佳宁, 吴馥晨, 王琛, 刘元剑 (3738)
- 单相级联 H 桥整流器简化两矢量模型预测功率控制.....宋文胜, 陈津辉, 刘碧, 蒋蔚 (3751)
- 轨道交通牵引逆变器调制策略性能比较.....周明磊, 王琛琛, 游小杰, 徐丛谦 (3763)

· 电机与电器 ·

- 基于特征结构配置的电磁轴承高速电机刚性转子系统鲁棒输出反馈控制器的设计.....周天豪, 祝长生 (3775)
- 基于闭环电流预测的永磁同步电机电流环延时补偿策略研究.....鄢永, 黄文新 (3786)
- 转子结构对低谐波星-三角绕组永磁电机性能影响研究.....汤俊, 陈演斐, 李志新, 范晨阳, 李家玉 (3796)
- 无传感器接触器断开时间在线检测.....张长坤, 许志红 (3805)
- 考虑非线性特性的剩余电流互感器建模及其输出调理电路参数设计
.....李奎, 解晨雨, 牛峰, 徐子健, 王超然, 武一 (3815)

· 高电压技术 ·

- 一种适应变压器内部环境的高灵敏光学压力感知方法
.....冀茂, 黄猛, 郑玉平, 齐波, 滕皓楠, 郑伟, 潘书燕, 李成榕 (3826)
- 计及热老化程度的变压器绕组内线圈短路承受能力评估方法.....张凡, 李秀广, 朱筱瑜, 庄哲, 师愉航, 汲胜昌 (3836)
- 液相扰动对水中预击穿过程的影响.....李显东, 何桦, 肖天飞, 熊鼎, 李剑 (3846)
- 基于分子链位移的 HVDC 电缆接头界面区域空间电荷分布研究
.....王雅妮, 孙远远, 张帅, 任品顺, 杨兴武, 王亚林, 尹毅 (3854)

· 教育与教学 ·

- 电力电子类课程思政建设路径探讨与实践.....肖华锋, 程明, 花为, 王政 (3864)

· 英文概述见论文电子版 ·

PROCEEDINGS OF THE CHINESE SOCIETY FOR
ELECTRICAL ENGINEERING
(PROCEEDINGS OF THE CSEE)

Vol.42 No.10 (Ser. 693)

May 20, 2022

CONTENTS

(Electronic Journals <http://www.pcsee.org/EN/volumn/current.shtml>)

• **Smart Grid** •

- Electricity Consumption Data Quality Improvement Algorithm Based on Matrix Norm Optimization Theory
..... YANG Ting, SUN Zhaoshuai, JI Hao, YE Zhishan, GENG Yinan (3501)
- Coordinated Operation for Data Center and Power System in the Context of Energy Internet (II): Opportunities and Challenges
..... CAO Yujie, DING Zhaozhao, WANG Peng, ZHANG Sufang, LIU Jizhen, LIU Wenjuan, CHENG Ming (3512)
- Multi-energy Synergy and Co-optimization Based on Blockchain (Part II): Platform and Case
..... SHEN Zeyu, CHEN Sijie, YAN Zheng, ZHANG Ling, SHU Guohua (3527)
- Non-monotonic Characteristics of Stability Margin of MMC System With the Change of Inner Loop Current Control Bandwidth and Its Mechanism Analysis
..... WANG Yanning, GUO Chunyi, YANG Shuo, PANG Bo, LIN Xin (3538)
- Operation Optimization Strategy of Multi Integrated Energy Service Companies Based on Cooperative Game Theory
..... CUI Mingyong, XUAN Mingyang, LU Zhigang, HE Liangce (3548)
- Super-resolution Reconstruction of Electric Equipment's Thermal Imaging Based on Generative Adversarial Network With Edge-attention
..... ZHAO Hongshan, PENG Yihao, LIU Bingcong, WANG Zhen, WANG Kui (3564)
- Regional Power Grid LSTM Dispatch Strategy Considering the Difference Between Electric Vehicle Demand and Time-of-use Electricity Price
..... SHI Wenlong, QIN Wenping, WANG Libin, YAO Hongmin, JING Xiang, ZHU Yunjie, XUE Shaokai (3573)
- Fault Induced Transients Based Differential Protection Strategy for Half-wavelength Transmission Lines
..... CAO Pulin, WANG Deng, FAN Haoran, SHU Hongchun, HAN Yiming, YANG Bo, DONG Jun (3587)

• **Grid Integration of Renewable Energy Resources** •

- SSO Supplementary Damping Control Method for DFIG based on Model-free Adaptive Control
..... WU Xi, WANG Mengting, SHI Xingyu, XU Shanshan, YUAN Chao, YANG Hongyu (3601)
- Modeling and Mechanism Analysis of Sub/Super-synchronous Oscillation of Grid-connected DFIG Wind Farms (Part II): Analysis of Impedance Characteristic and Oscillation Mechanism
..... LI Guanghui, WANG Weisheng, ZHANG Xing, HE Guoqing, LIU Chun (3614)
- The Interaction Mechanism Analysis Among the Different Control Loops of the Direct-drive Wind Turbine Connected VSC-HVDC Systems
..... YIN Rui, SUN Yuanyuan, WANG Shanshan, ZHAO Bing, WU Guanglu, QIN Shanmeng, ZHAO Yuetong, WANG Tiezhu (3627)
- Inertia Limit Optimization of Multi-energy System Considering the Transport Characteristics of Heterogeneous Energy Flow
..... SUN Peng, TENG Yun, HUI Qian, CHEN Zhe (3642)

• **Power Generation** •

- Multi-index Fault Diagnosis Model of Steam Turbo Generator Based on Stacked Autoencoder Model
..... YE Lin, GE Ouxiang, GUO Yonghong, MEI Dongsheng, MAO Yongqing, WANG Bin, LU Peng, DAI Binhua (3656)
- Optimal Control Method for Multi-stack Fuel Cells Considering System Hydrogen Consumption and Durability
..... CAI Liangdong, LI Qi, LIU Qiang, WANG Tianhong, YANG Wen, CHEN Weirong (3670)
- Study on $\text{Ca}(\text{OH})_2/\text{CaO}$ Thermochemical Energy Storage Performance of Reactor With Embedded Heating Tube Bundle
..... LIU Xuguang, DUAN Liqiang (3680)
- Effects of Fuel Pre-reforming Ratio on System Design Performance of a Natural Gas Solid Oxide Fuel Cell/Gas Turbine Hybrid System
..... HUANG Shanglong, YANG Chen, CHEN Hao, MA Qiang, ZHAO Bo (3691)
- Study on the Influence of Operating Head on Cavitation Performance of An Ultra-low Head Two-blade Tubular Turbine
..... SUN Jie, GE Xinfeng, CAI Jianguo, ZHANG Hui, WU Enquan, JIANG Mei, ZHU Shuangju, HAN Yang, ZHAO Lei, ZHENG Yuan (3701)
- Height Optimization of Phase Change Material in Cascaded Latent Heat Storage Device Based on Orthogonal Test
..... CAO Lihua, LI Yaqiang, YU Jingwen (3711)

• **Power Electronics and Drives** •

- Matrix Inductor-transformer Integration and Optimization Design for CLLC Bidirectional Resonant Converter
..... LI Junjie, WU Hongfei, HUA Wenmin, YANG Fan, LIU Yue, HE Jing, CHENG Yujie (3720)
- Research on the Technology of Realizing Active Damping Based on Negative Band-pass Filter Feedback of Grid Current
..... LI Mingming, XIAO Huafeng (3729)
- Research on the Design of Laminated Busbar Based on Discrete Devices in Parallel to the Silicon Carbide Inverter
..... YU Shaolin, ZHANG Xing, WANG Jianing, WU Fuchen, WANG Chen, LIU Yuanjian (3738)
- A Simplified Dual-vector-based Model Predictive Power Control for Single-phase Cascaded H-bridge Rectifiers
..... SONG Wensheng, CHEN Jinhui, LIU Bi, JIANG Wei (3751)
- Comparison of Pulse Width Modulation Strategies for Traction Inverters in Rail Transit
..... ZHOU Minglei, WANG Chenchen, YOU Xiaojie, XU Congqian (3763)

• **Electric Machines and Apparatus** •

- Design of Robust Output Controller for an Active Magnetic Bearing High-speed Motor Rigid Rotor System Based on Eigenstructure Assignment
..... ZHOU Tianhao, ZHU Changsheng (3775)
- Research on Delay Compensation Strategy of Permanent Magnet Synchronous Motor Based on Closed-loop Current Prediction
..... YAN Yong, HUANG Wenxin (3786)
- Influence of Rotor Structure on Performance of Low Harmonic Star-delta Hybrid Winding FSCW-PM Machine
..... TANG Jun, CHEN Zhenfei, LI Zhixin, FAN Chenyang, LI Jiayu (3796)
- Sensorless Online Opening Time Estimation of Contactors
..... ZHANG Changkun, XU Zhihong (3805)
- Modeling of Residual Current Transformer Considering Nonlinear Characteristics and Design of Output Conditioning Circuit Parameters
..... LI Kui, XIE Chenyu, NIU Feng, XU Zijian, WANG Chaoran, WU Yi (3815)

• **High Voltage Engineering** •

- High Sensitive Pressure Optical Sensing Method Adapted to Transformer Internal Environment
..... JI Mao, HUANG Meng, ZHENG Yuping, QI Bo, TENG Haonan, ZHENG Wei, PAN Shuyan, LI Chengrong (3826)
- Assessment of the Withstand Ability to Short Circuit of Inner Windings in Power Transformers Considering the Degree of Thermal Aging
..... ZHANG Fan, LI Xiuguang, ZHU Xiaoyu, ZHUANG Zhe, SHI Yuhang, JI Shengchang (3836)
- Influence of Liquid Phase Disturbance on Underwater Pre-breakdown Process
..... LI Xiandong, HE Hua, XIAO Tianfei, XIONG Ding, LI Jian (3846)
- Study on Interface Region Space Charge Distribution of HVDC Cable Joints Based on Molecular Chain Dynamics
..... WANG Yani, SUN Yuanyuan, ZHANG Shuai, REN Pinshun, YANG Xingwu, WANG Yalin, YIN Yi (3854)

• **Education and Teaching** •

- Construction Method of Curriculum Ideology and Its Practice Based on Power Electronics Discipline
..... XIAO Huafeng, CHENG Ming, HUA Wei, WANG Zheng (3864)

• **For Extended Summaries, Please See the Electronic Journals** •